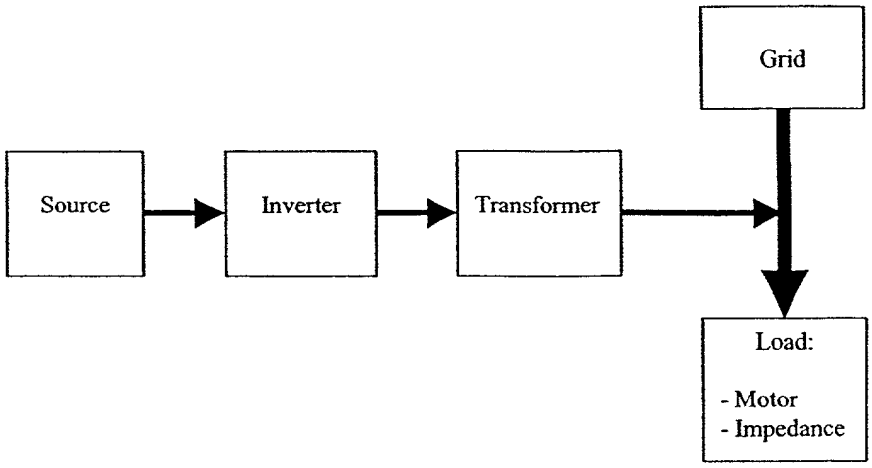
FIG. 1



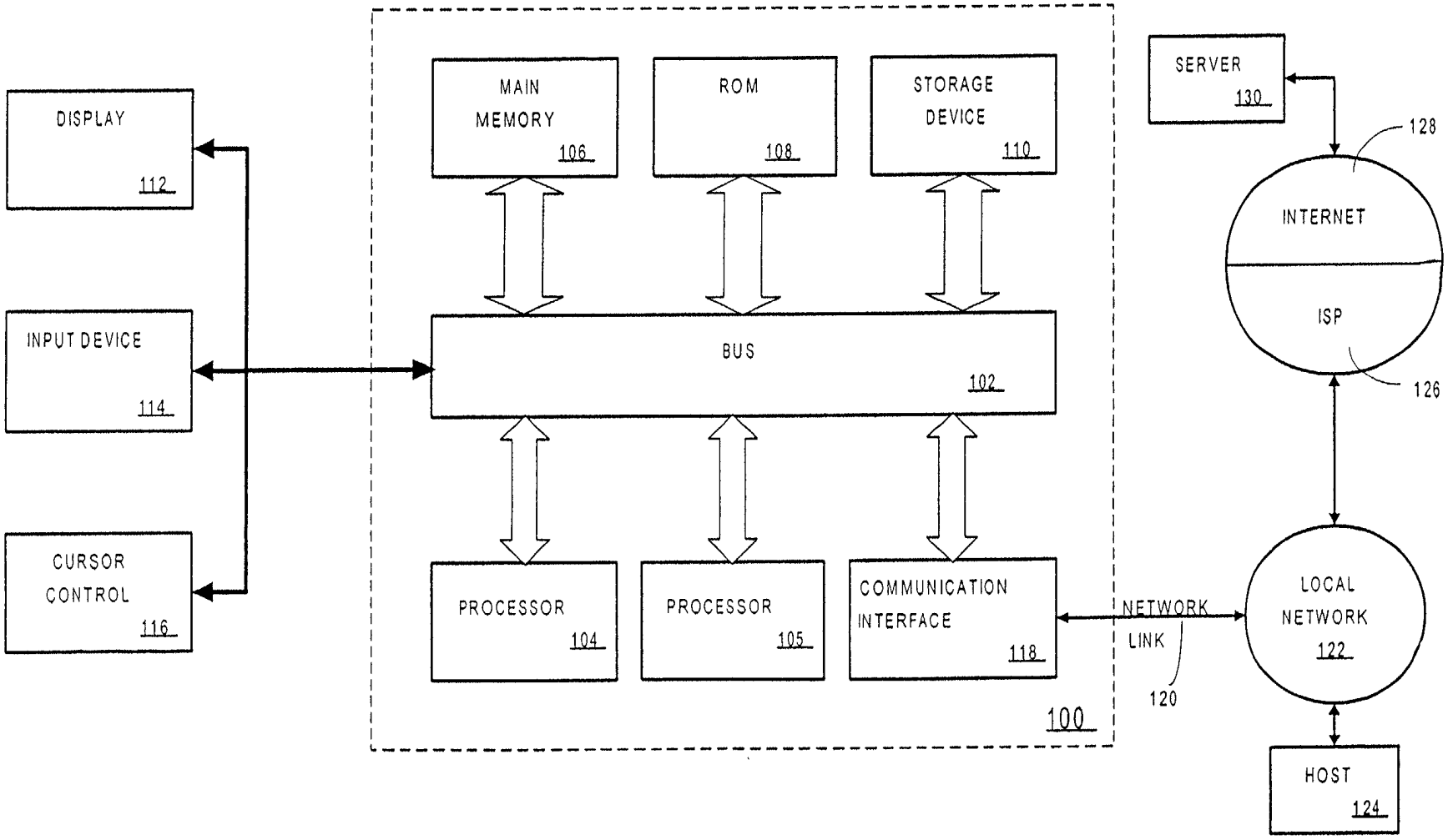

DISPLAY
112
INPUT DEVICE
114
CURSOR
CONTROL
116
MAIN
MEMORY
106
ROM
108
STORAGE
DEVICE
110
BUS
102
PROCESSOR
104
PROCESSOR
105
COMMUNICATION
INTERFACE
118
100
NETWORK
LINK
120
SERVER
130
128
INTERNET
ISP
126
LOCAL
NETWORK
122
HOST
124

FIG. 2

Figure 3

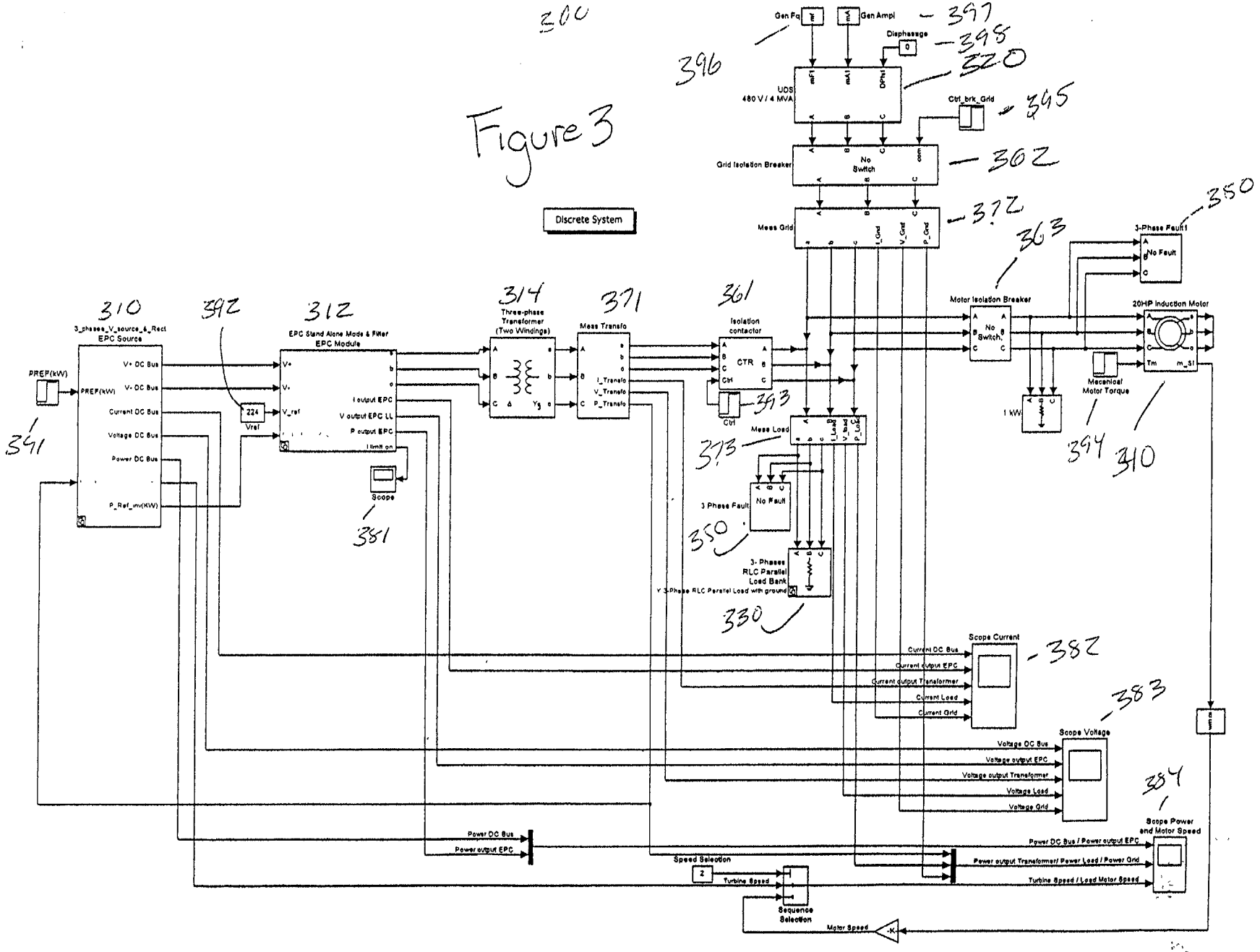


Figure 4

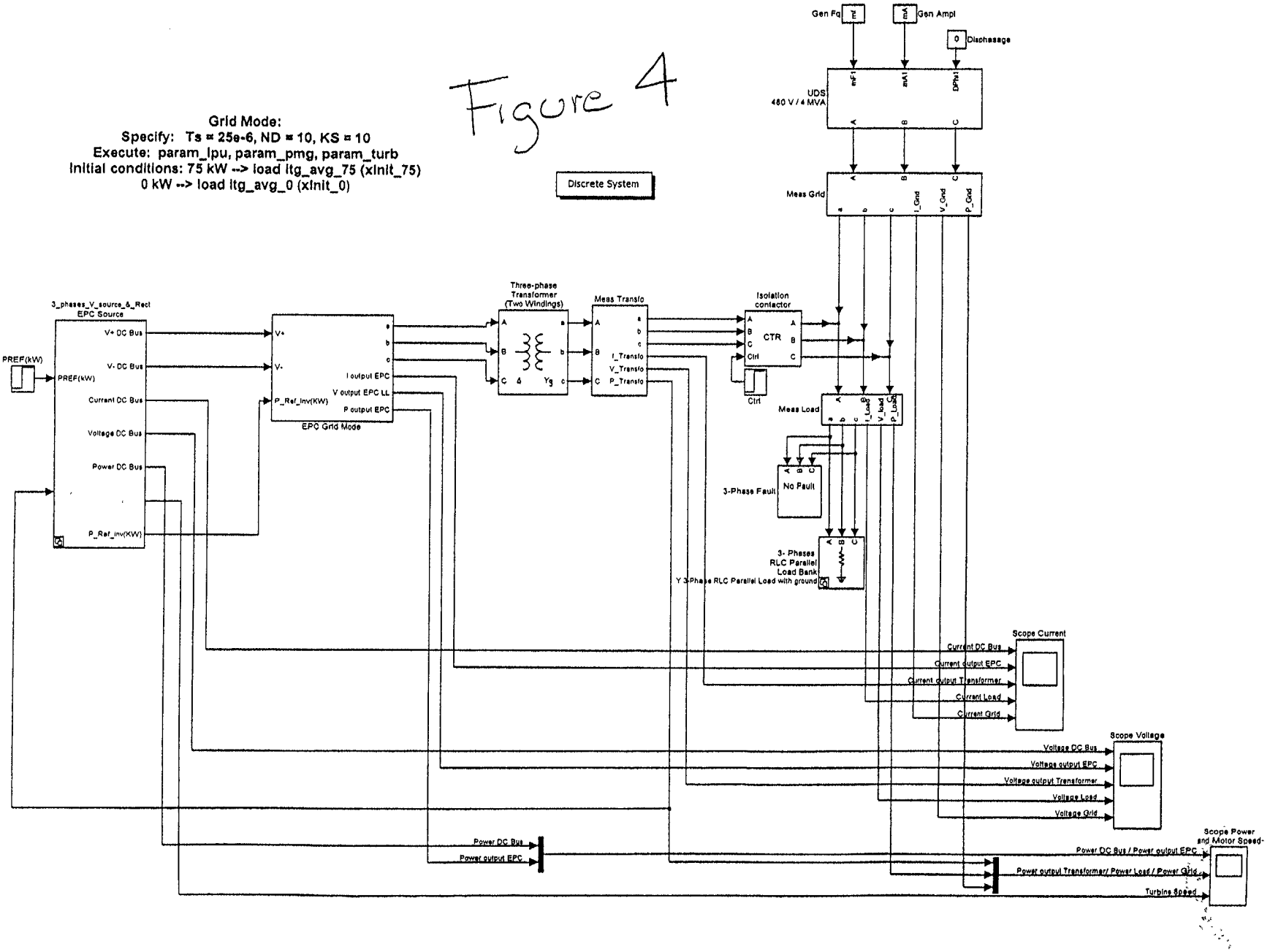
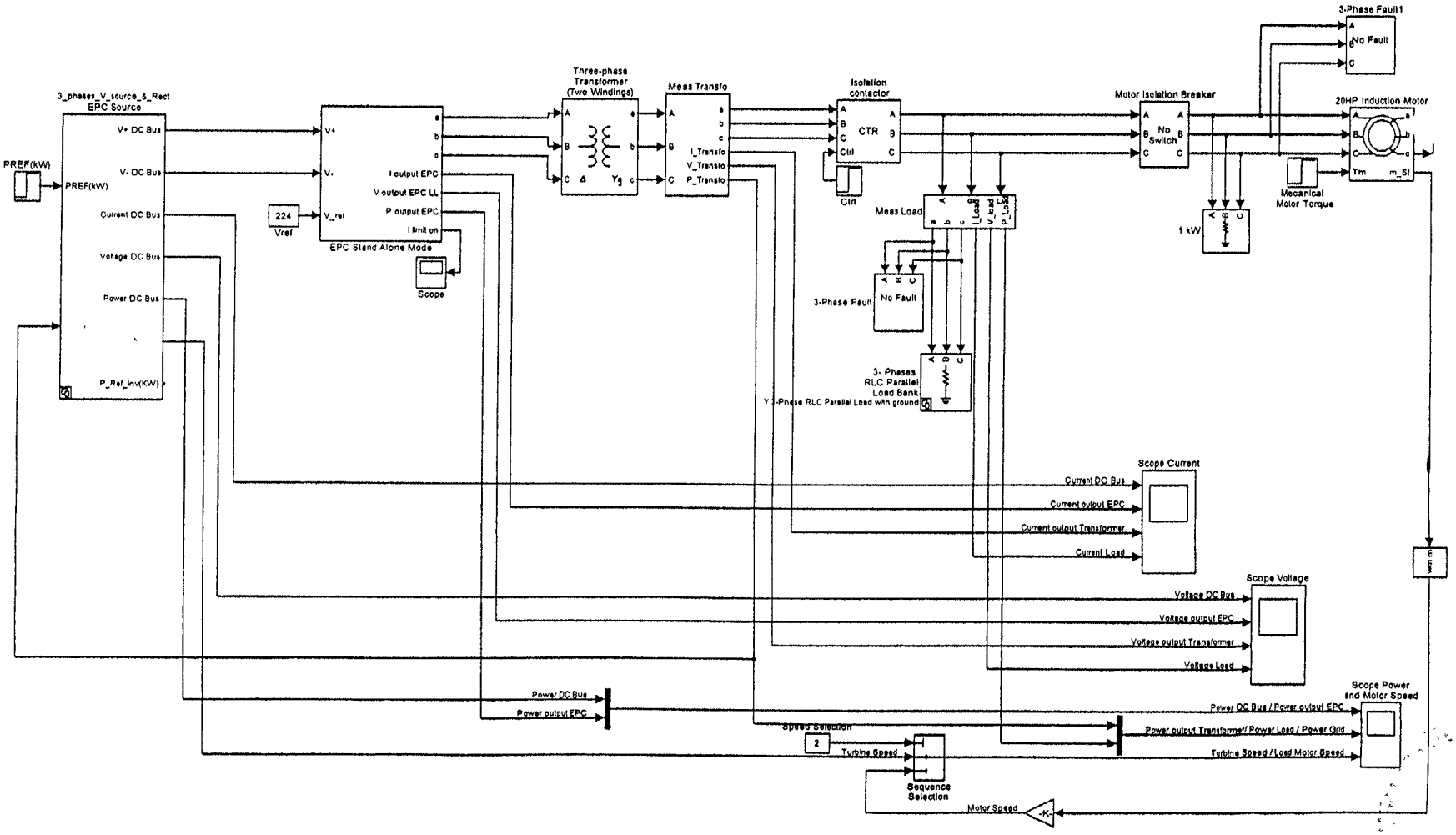

Grid Mode:
Specify: Ts = 25e-6, ND = 10, KS = 10
Execute: param_lpu, param_pmg, param_turb
Initial conditions: 75 kW --> load itg_avg_75 (xInit_75)
0 kW --> load itg_avg_0 (xInit_0)
Discrete System
Gen Fq
Gen Ampl
Dephasage
UDS
460 V / 4 MVA
Meas Grid
3_phases_V_source_&_Rect
EPC Source
V+ DC Bus
V- DC Bus
Current DC Bus
Voltage DC Bus
Power DC Bus
P_Ref_Inv(KW)
PREF(kW)
EPC Grid Mode
I output EPC
V output EPC LL
P output EPC
Three-phase
Transformer
(Two Windings)
Meas Transfo
I_Transfo
V_Transfo
P_Transfo
Isolation
contactor
CTR
Ctrl
Meas Load
3-Phase Fault
No Fault
3- Phases
RLC Parallel
Load Bank
3-Phase RLC Parallel Load with ground
Scope Current
Current DC Bus
Current output EPC
Current output Transformer
Current Load
Current Grid
Scope Voltage
Voltage DC Bus
Voltage output EPC
Voltage output Transformer
Voltage Load
Voltage Grid
Scope Power
and Motor Speed
Power DC Bus
Power output EPC
Power DC Bus / Power output EPC
Power output Transformer/ Power Load / Power Grid
Turbine Speed

Figure 5


Stand Alone Mode:
Specify: Ts = 25e-6
Execute: param_Ipu, param_pmg
Discrete System
3_phases_V_source_&_Rect
EPC Source
V+ DC Bus
V- DC Bus
Current DC Bus
Voltage DC Bus
Power DC Bus
P_Ref_Inv(KW)
PREF(kW)
PREF(kW)
224
Vref
V+
V-
V_ref
I output EPC
V output EPC LL
P output EPC
I limit on
EPC Stand Alone Mode
Scope
Three-phase
Transformer
(Two Windings)
Meas Transfo
I_Transfo
V_Transfo
P_Transfo
Isolation
contactor
CTR
Ctrl
Meas Load
3-Phase Fault
No Fault
3- Phases
RLC Parallel
Load Bank
Y 3-Phase RLC Parallel Load with ground
Motor Isolation Breaker
No
Switch
1 kW
3-Phase Fault1
No Fault
20HP Induction Motor
Tm
m_SI
Mecanical
Motor Torque
Scope Current
Current DC Bus
Current output EPC
Current output Transformer
Current Load
Scope Voltage
Voltage DC Bus
Voltage output EPC
Voltage output Transformer
Voltage Load
Scope Power
and Motor Speed
Power DC Bus / Power output EPC
Power output Transformer/ Power Load / Power Grid
Turbine Speed / Load Motor Speed
Power DC Bus
Power output EPC
Speed Selection
2
Turbine Speed
Sequence
Selection
Motor Speed
-K-

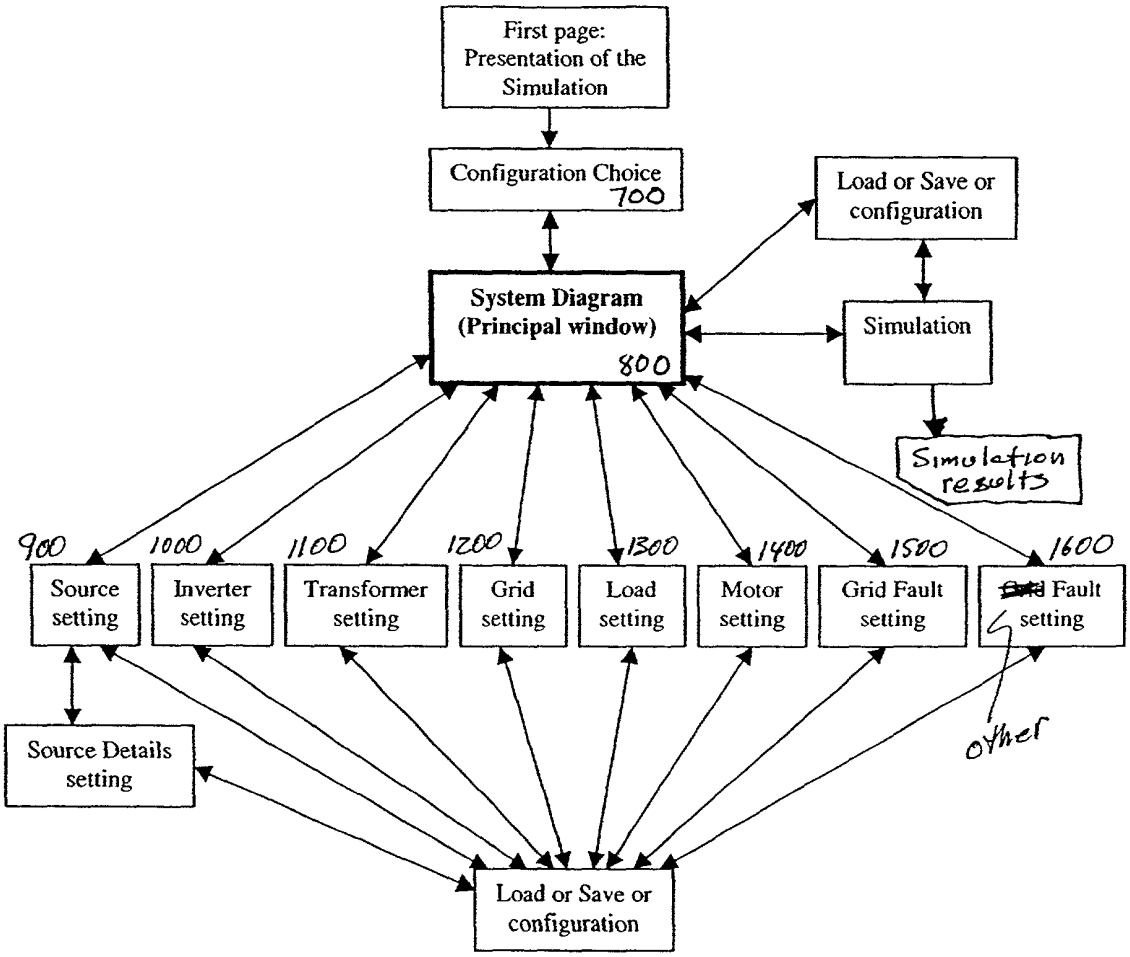

First page: Presentation of the Simulation
Configuration Choice
700
Load or Save or configuration
System Diagram (Principal window)
800
Simulation
Simulation results
900
1000
1100
1200
1300
1400
1500
1600
Source setting
Inverter setting
Transformer setting
Grid setting
Load setting
Motor setting
Grid Fault setting
Fault setting
other
Source Details setting
Load or Save or configuration

FIGURE 6

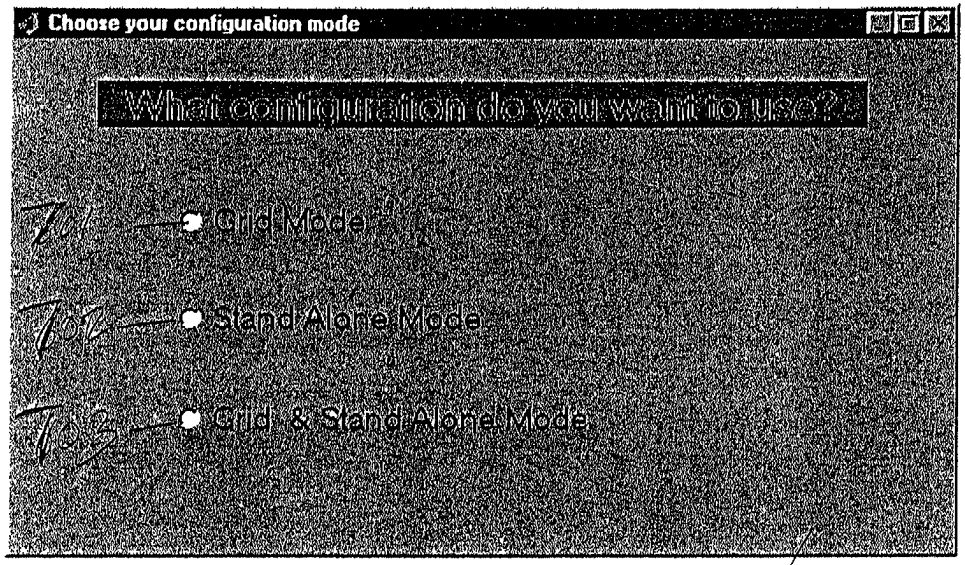
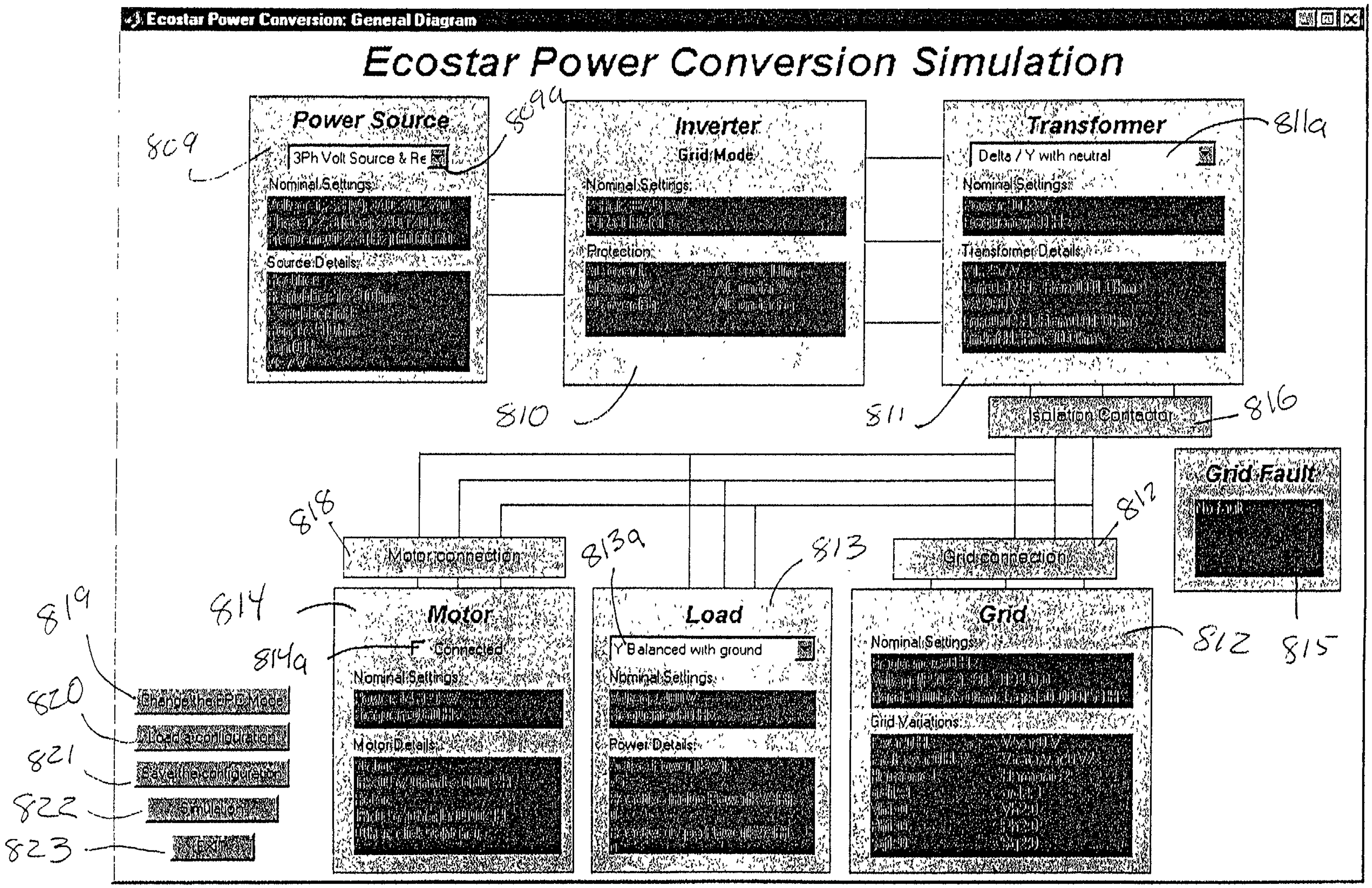


Figure 7



Ecostar Power Conversion: General Diagram
Ecostar Power Conversion Simulation
Power Source
3Ph Volt Source & Re
Nominal Settings:
Source Details:
Inverter
Grid Mode
Nominal Settings:
Protection:
Transfomer
Delta / Y with neutral
Nominal Settings:
Transformer Details:
Isolation Contactor
Grid Fault
Motor connection
Grid connection
Motor
Connected
Nominal Settings:
Motor Details:
Load
Y Balanced with ground
Nominal Settings:
Power Details:
Grid
Nominal Settings:
Grid Variations:
Change the PPC Mode
Load a configuration
Save the configuration
Simulation
Exit
809
809a
810
811
811a
812
813
813a
814
814a
815
816
817
818
819
820
821
822
823

FIGURE 8

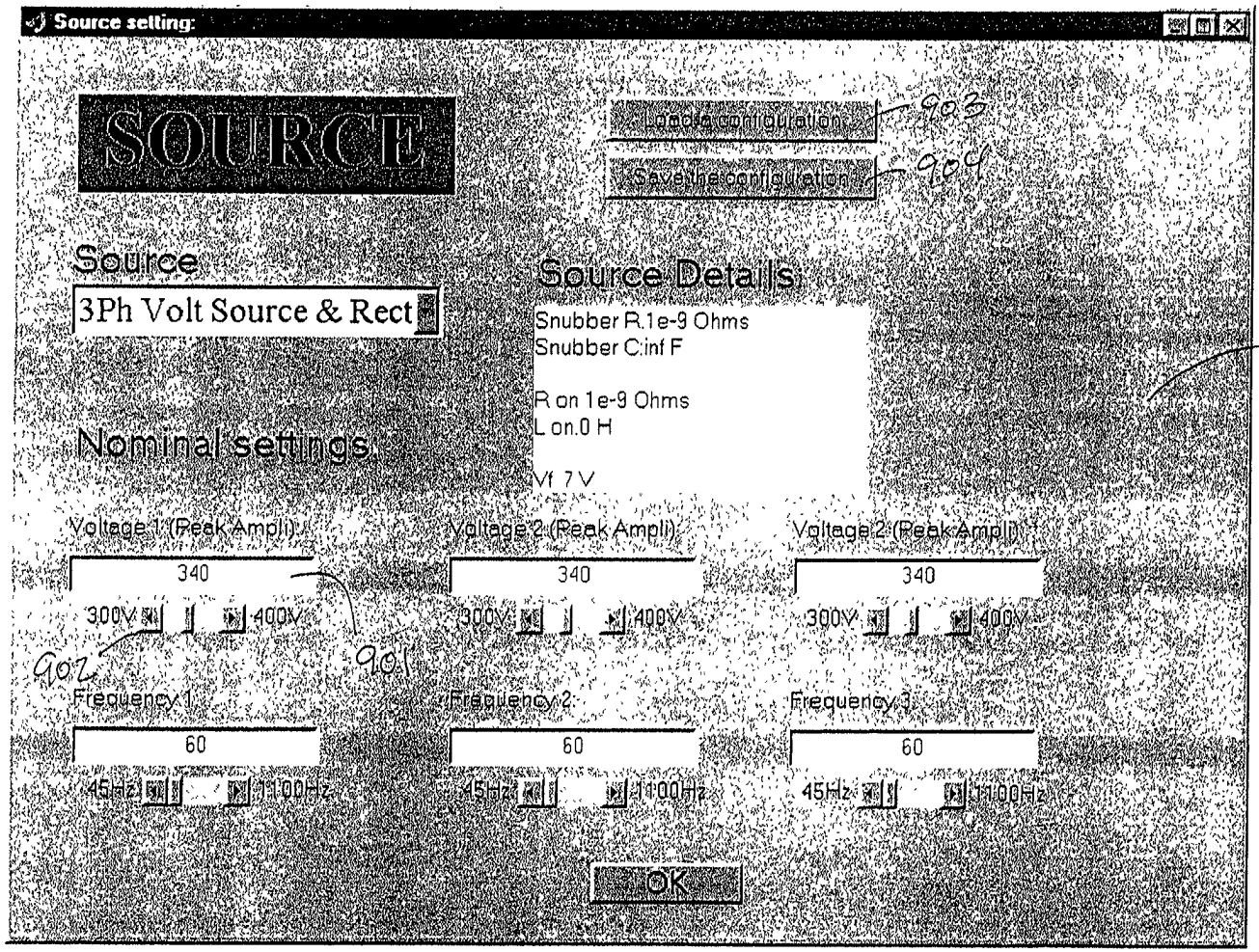

Source setting:
SOURCE
Load a configuration
Save the configuration
903
904
Source
3Ph Volt Source & Rect
Source Details:
Snubber R:1e-9 Ohms
Snubber C:inf F
R on 1e-9 Ohms
L on:0 H
Vf 7 V
900
Nominal settings
Voltage 1 (Peak Ampl)
Voltage 2 (Peak Ampl)
Voltage 2 (Peak Ampl)
340
340
340
300V
400V
300V
400V
300V
400V
902
901
Frequency 1
Frequency 2
Frequency 3
60
60
60
45Hz
1100Hz
45Hz
1100Hz
45Hz
1100Hz
OK

FIGURE 9 a

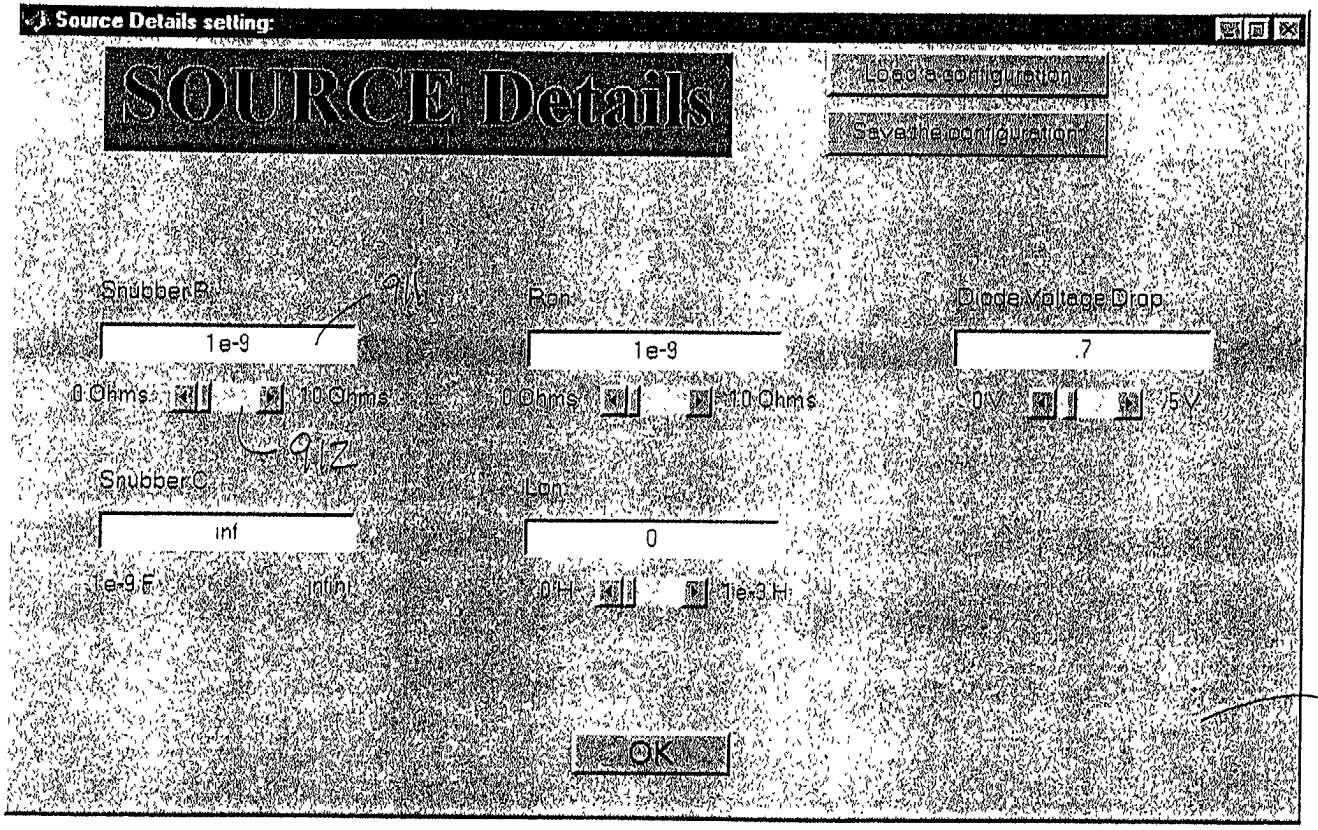

Source Details setting:
SOURCE Details
Load a configuration
Save the configuration
Snubber R
1e-9
0 Ohms
10 Ohms
Ron
1e-9
0 Ohms
10 Ohms
Diode Voltage Drop
.7
0 V
5 V
Snubber C
inf
1e-9 F
Inf F
Lon
0
0 H
1e-3 H
OK
910

Figure 9b

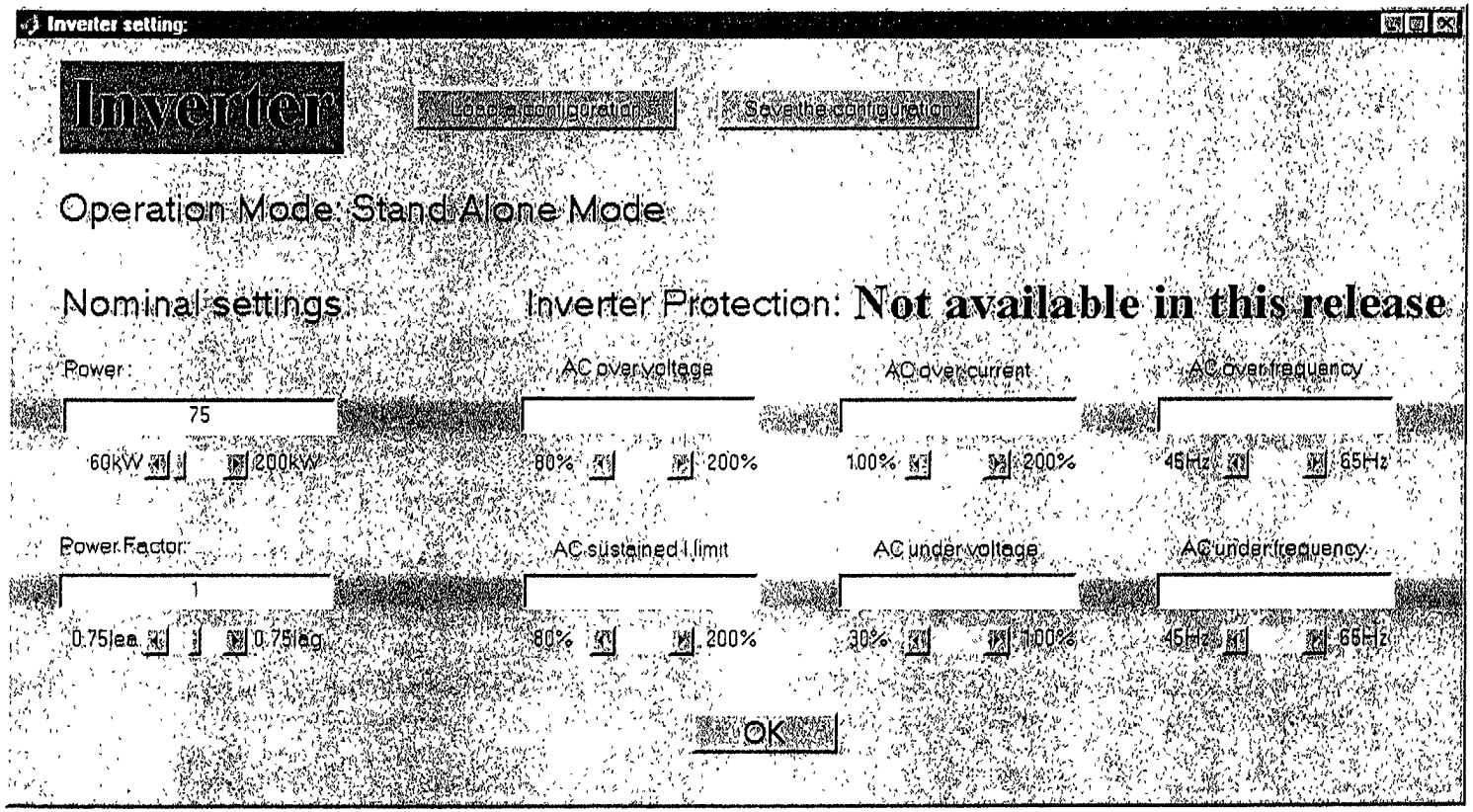

Inverter setting:
Inverter
Load a configuration
Save the configuration
Operation Mode: Stand Alone Mode
Nominal settings:
Inverter Protection: Not available in this release
Power:
75
60kW
200kW
AC over voltage
80%
200%
AC over current
100%
200%
AC over frequency
45Hz
65Hz
Power Factor:
1
0.75lea
0.75lag
AC sustained I limit
80%
200%
AC under voltage
30%
100%
AC under frequency
45Hz
65Hz
OK

Figure 10

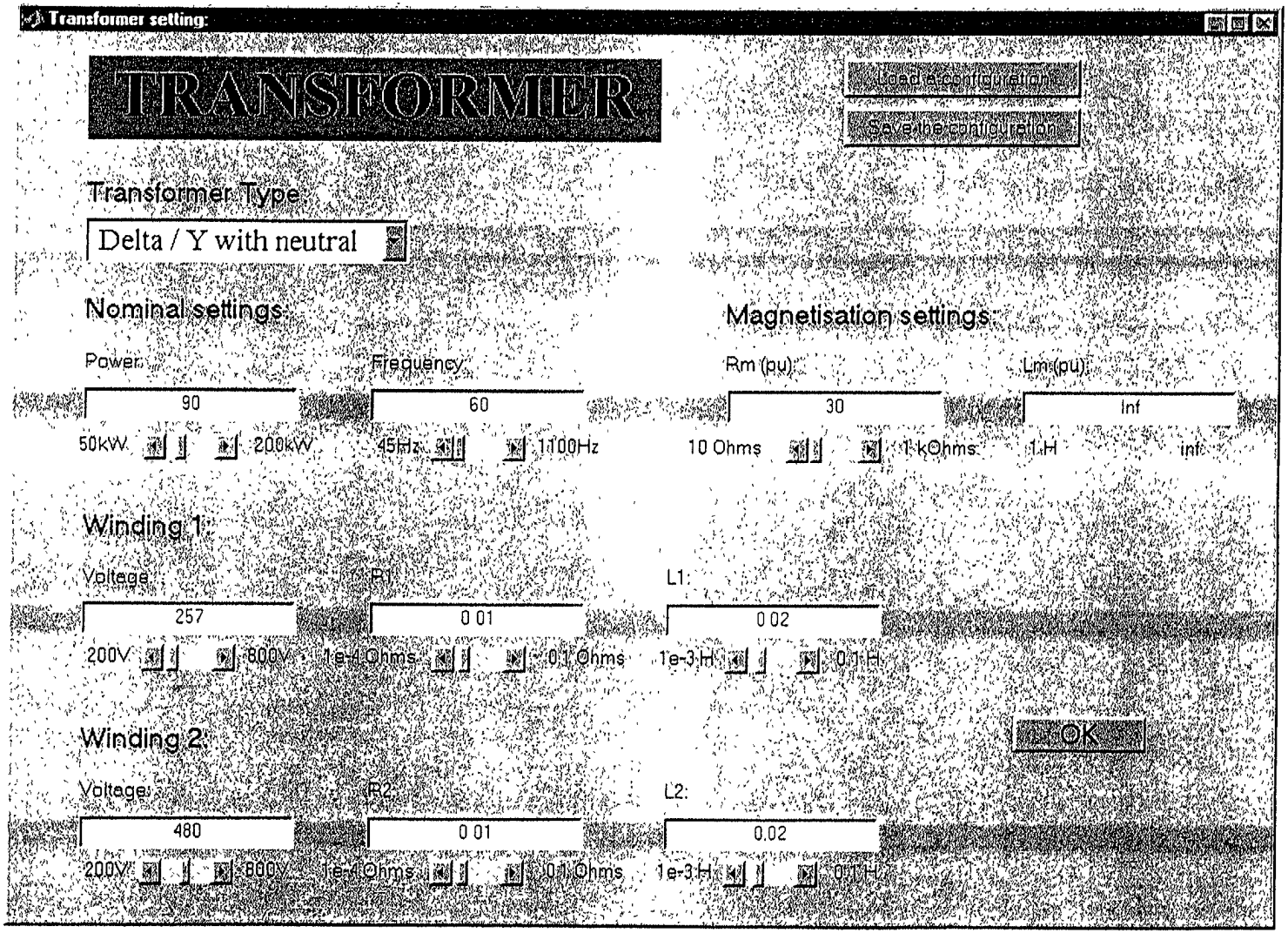

Transformer setting:
TRANSFORMER
Load a configuration
Save the configuration
Transformer Type:
Delta / Y with neutral
Nominal settings:
Power:
90
50kW
200kW
Frequency:
60
45Hz
1100Hz
Magnetisation settings:
Rm (pu):
30
10 Ohms
1 kOhms
Lm (pu):
Inf
1 H
inf
Winding 1:
Voltage:
257
200V
800V
R1:
0 01
1e-4 Ohms
0 1 Ohms
L1:
0 02
1e-3 H
0 1 H
OK
Winding 2:
Voltage:
480
200V
800V
R2:
0 01
1e-4 Ohms
0 1 Ohms
L2:
0.02
1e-3 H
0 1 H

Figure 11

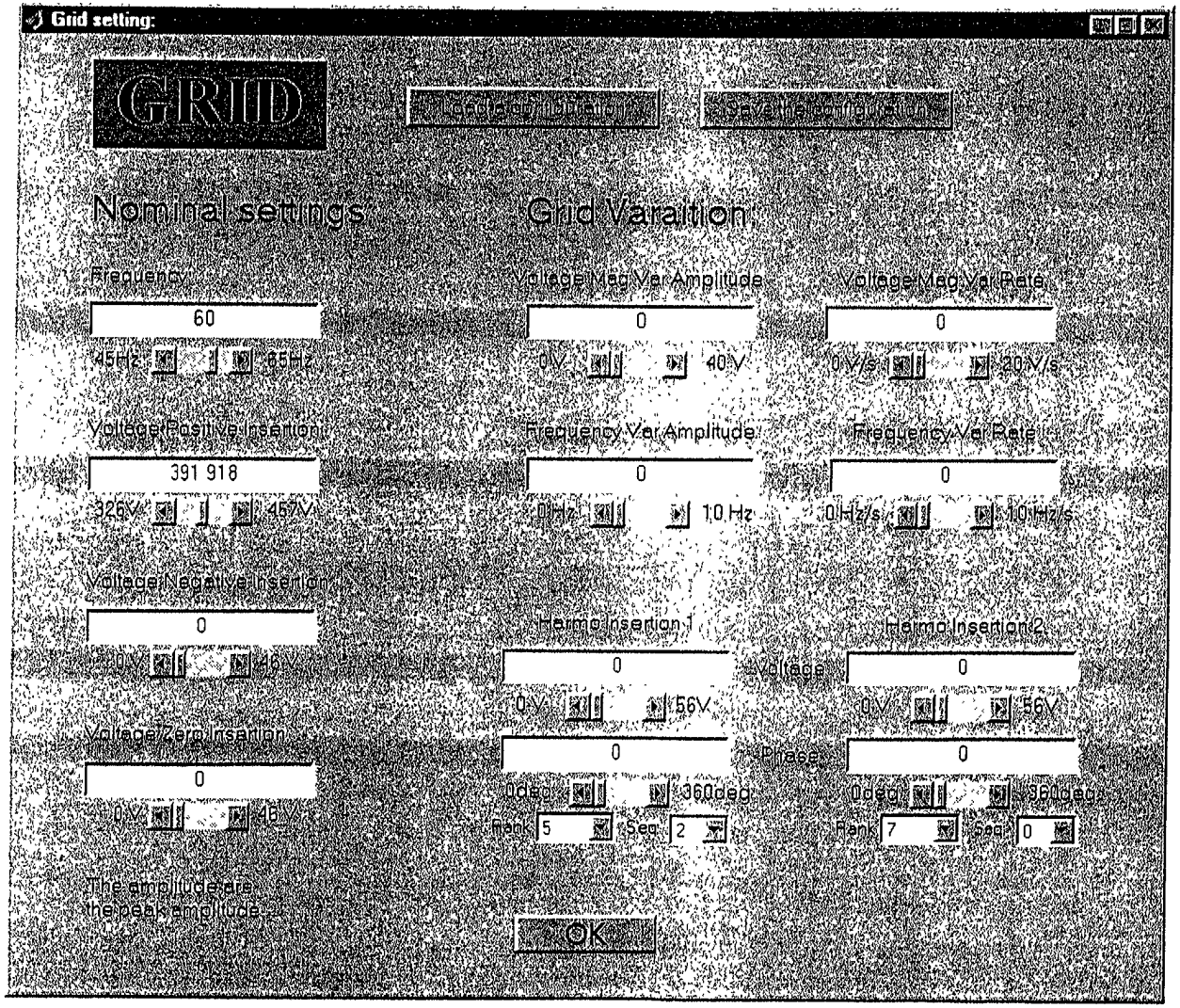

Grid setting:
GRID
Load configuration
Save the configuration
Nominal settings
Frequency
60
45Hz
65Hz
Voltage Positive Insertion
391 918
326V
457V
Voltage Negative Insertion
0
0V
46V
Voltage Zero Insertion
0
0V
46V
The amplitudes are the peak amplitude
Grid Varaition
Voltage Mag Var Amplitude
0
0V
40V
Voltage Mag Var Rate
0
0V/s
20V/s
Frequency Var Amplitude
0
0Hz
1.0Hz
Frequency Var Rate
0
0Hz/s
1.0Hz/s
Harmo Insertion 1
0
0V
56V
0
0deg
360deg
Rank 5
Seq 2
Harmo Insertion 2
Voltage
0
0V
56V
Phase
0
0deg
360deg
Rank 7
Seq 0
OK

Figure 12

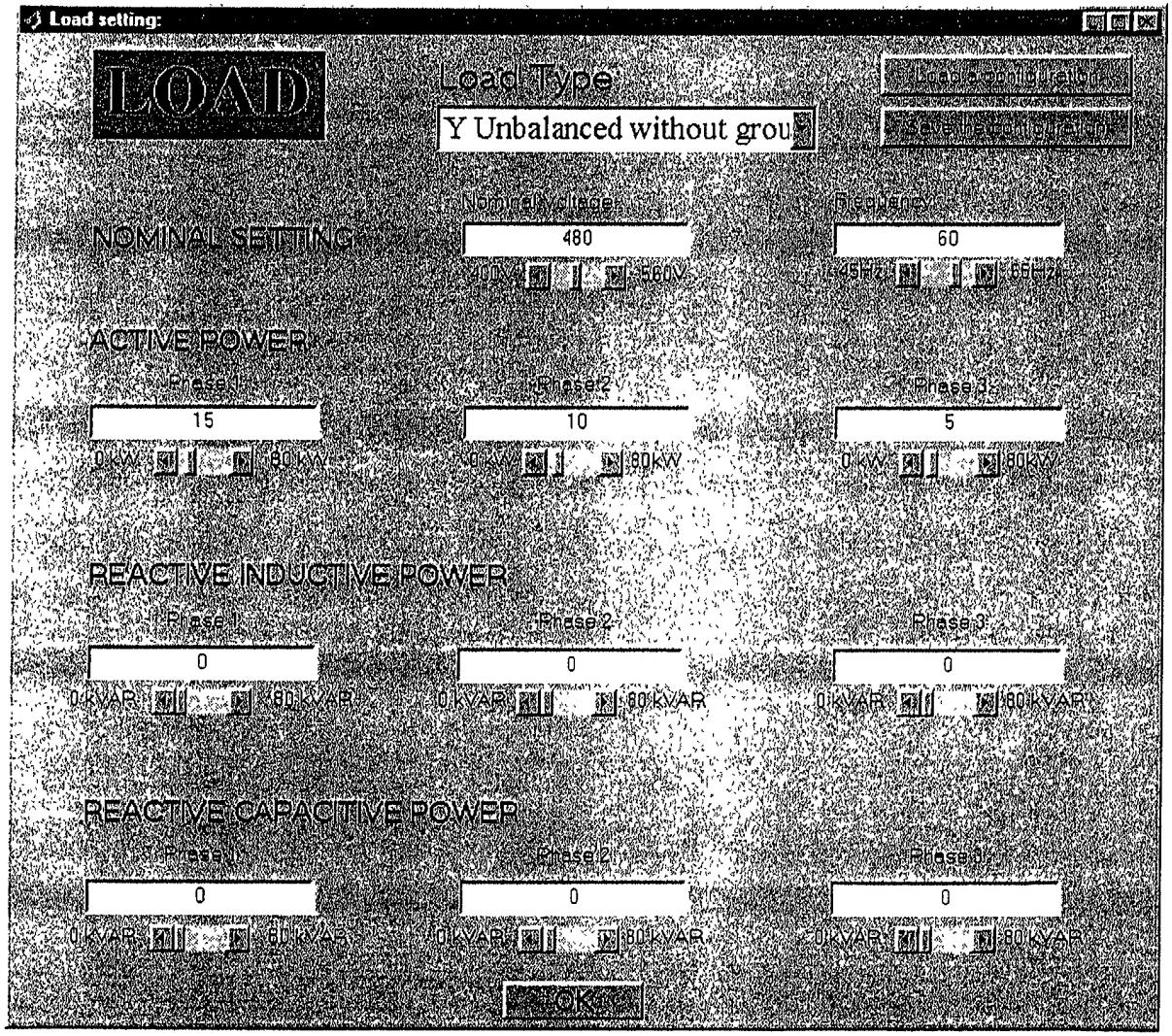

Load setting:
LOAD
Load Type
Y Unbalanced without grou
Load configuration
Save/recall configuration
NOMINAL SETTING
Nominal Voltage
480
400V
560V
Frequency
60
45Hz
65Hz
ACTIVE POWER
Phase 1
15
0 kW
80 kW
Phase 2
10
0 kW
80kW
Phase 3
5
0 kW
80kW
REACTIVE INDUCTIVE POWER
Phase 1
0
0 KVAR
80 KVAR
Phase 2
0
0 KVAR
80 KVAR
Phase 3
0
0 KVAR
80 KVAR
REACTIVE CAPACITIVE POWER
Phase 1
0
0 KVAR
80 KVAR
Phase 2
0
0 KVAR
80 KVAR
Phase 3
0
0 KVAR
80 KVAR
OK

Figure 13

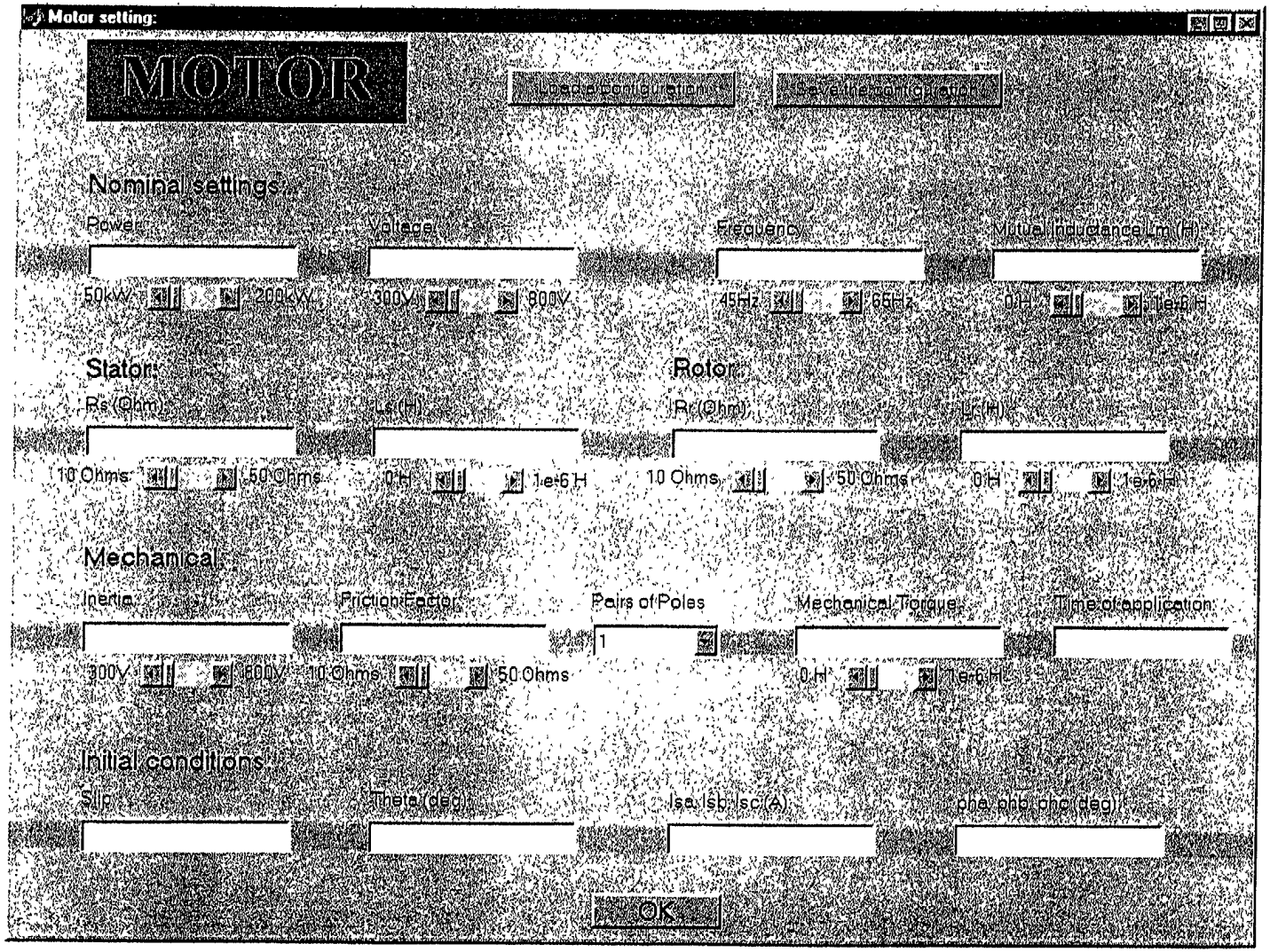


Figure 14

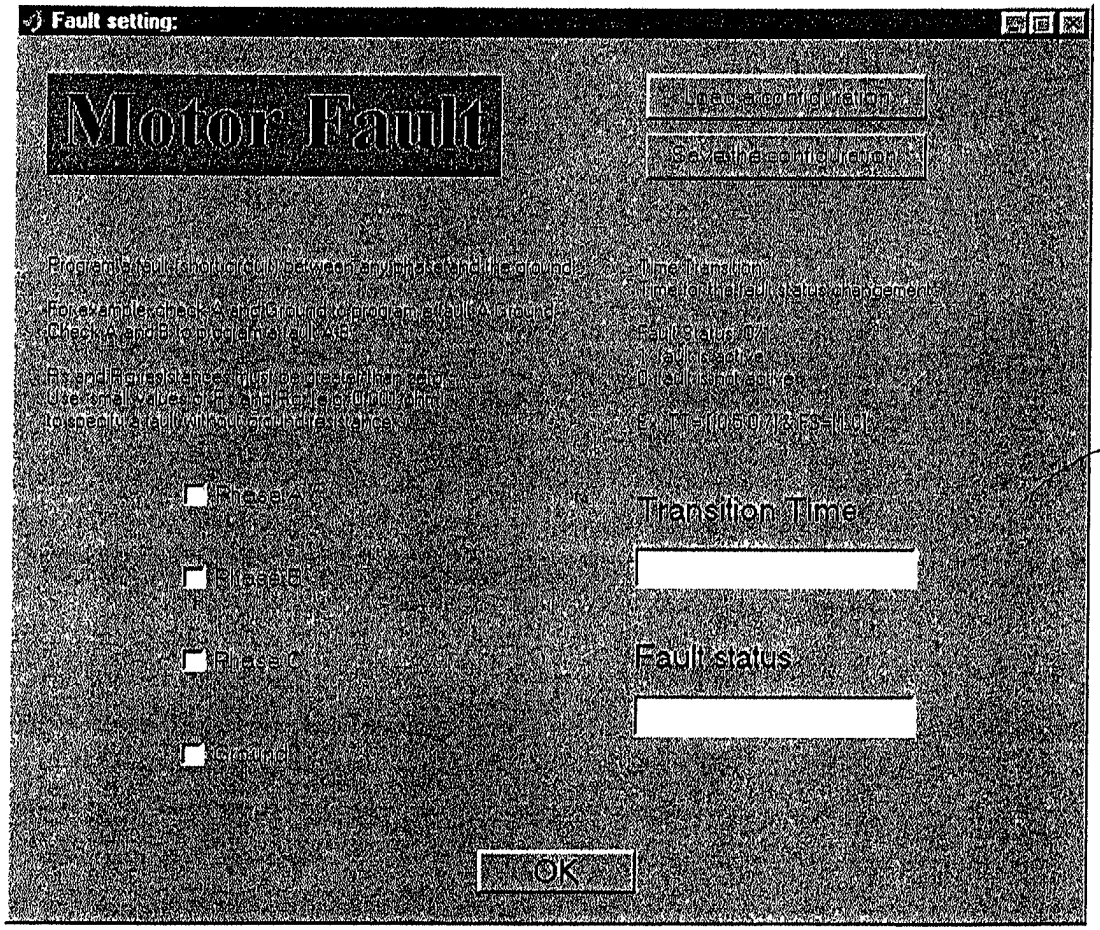

Fault setting:
Motor Fault
Load configuration
Save the configuration
Time transition
Time for the fault status change event
Fault Status (0)
Fault is not active
Transition Time
Fault status
OK
1500

Figure 15

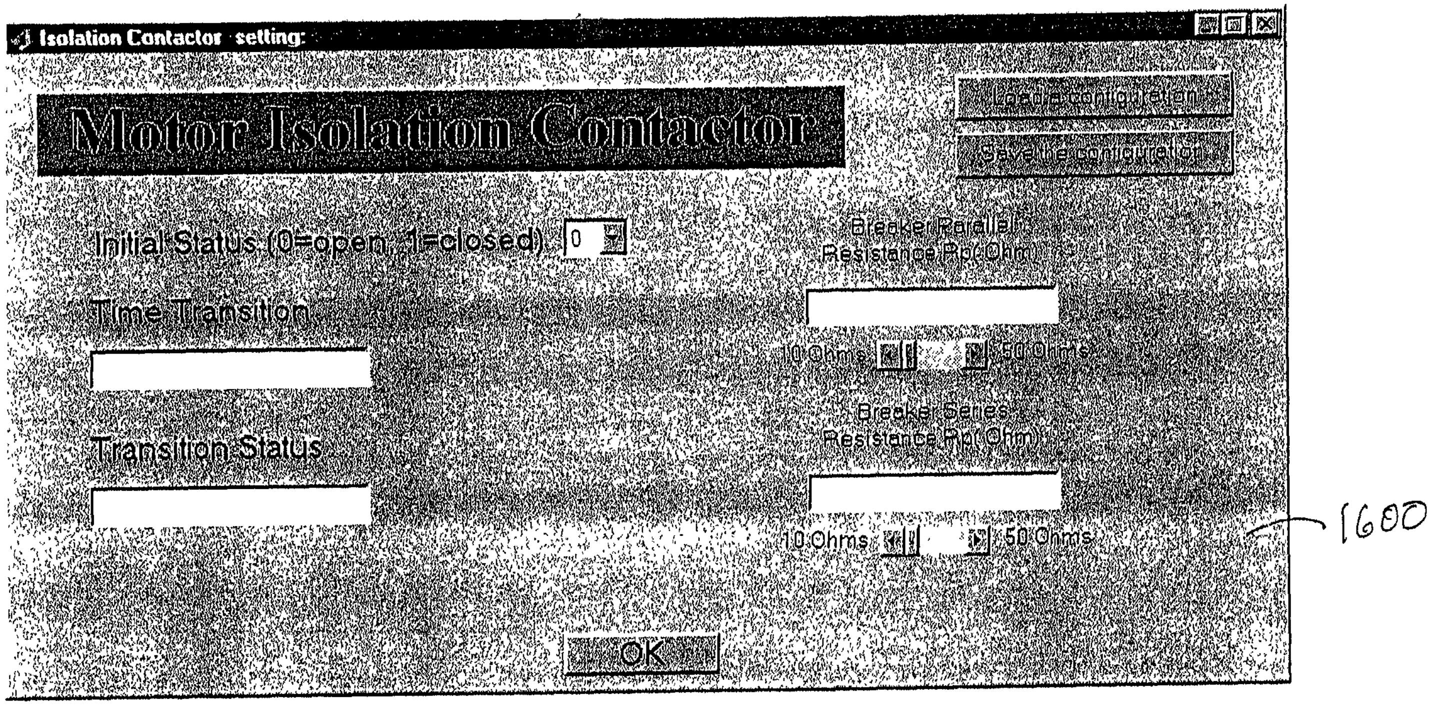
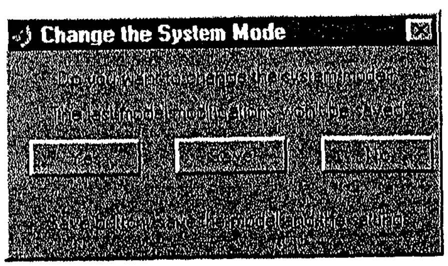
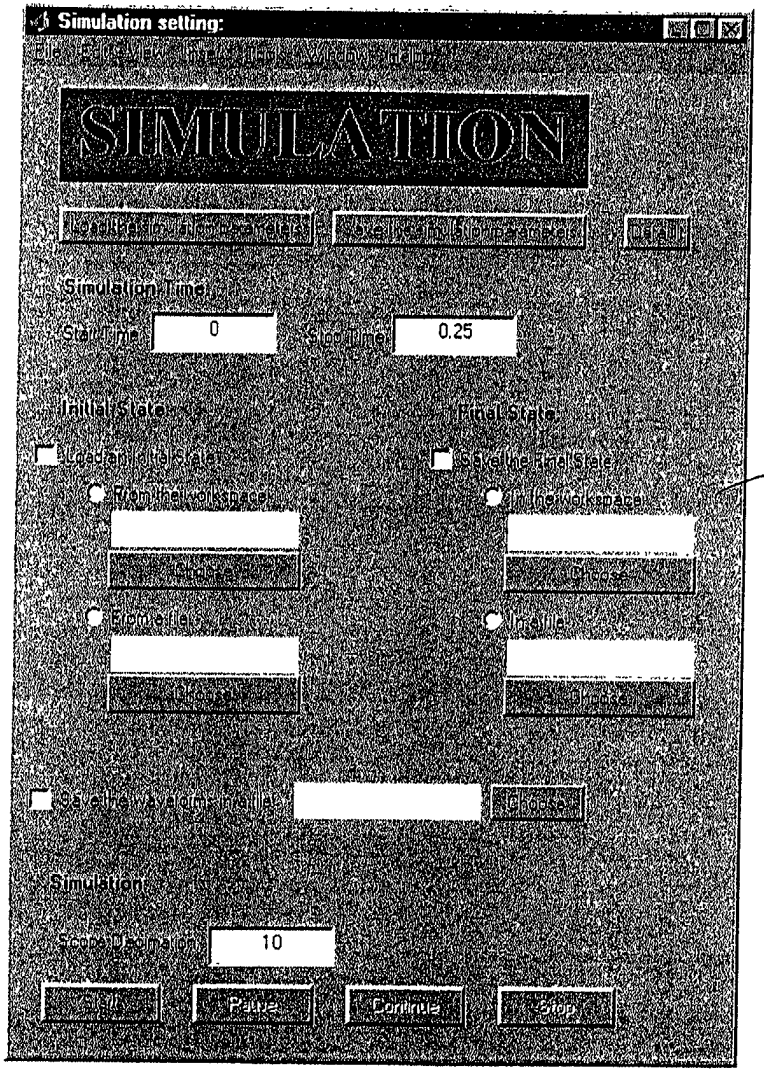

Isolation Contactor setting:
Motor Isolation Contactor
Load a configuration
Save the configuration
Initial Status (0=open, 1=closed)
0
Time Transition
Transition Status
Breaker Parallel
Resistance Rp(Ohm)
10 Ohms
50 Ohms
Breaker Series
Resistance Rp(Ohm)
10 Ohms
50 Ohms
OK
1600

Figure 16


Change the System Mode



1700

Figure 17

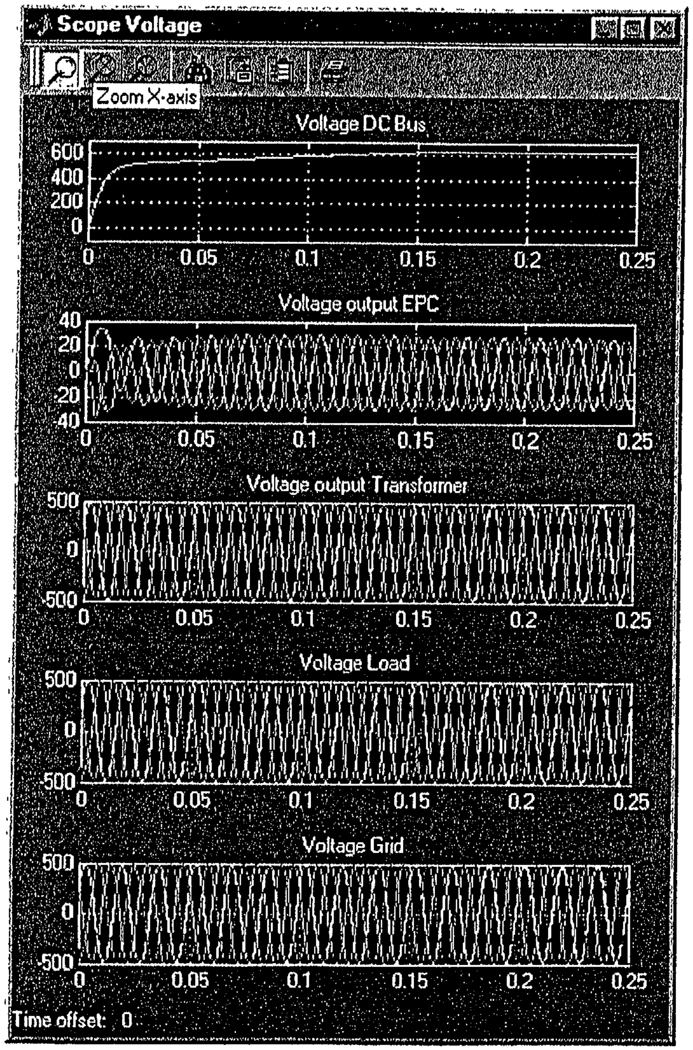
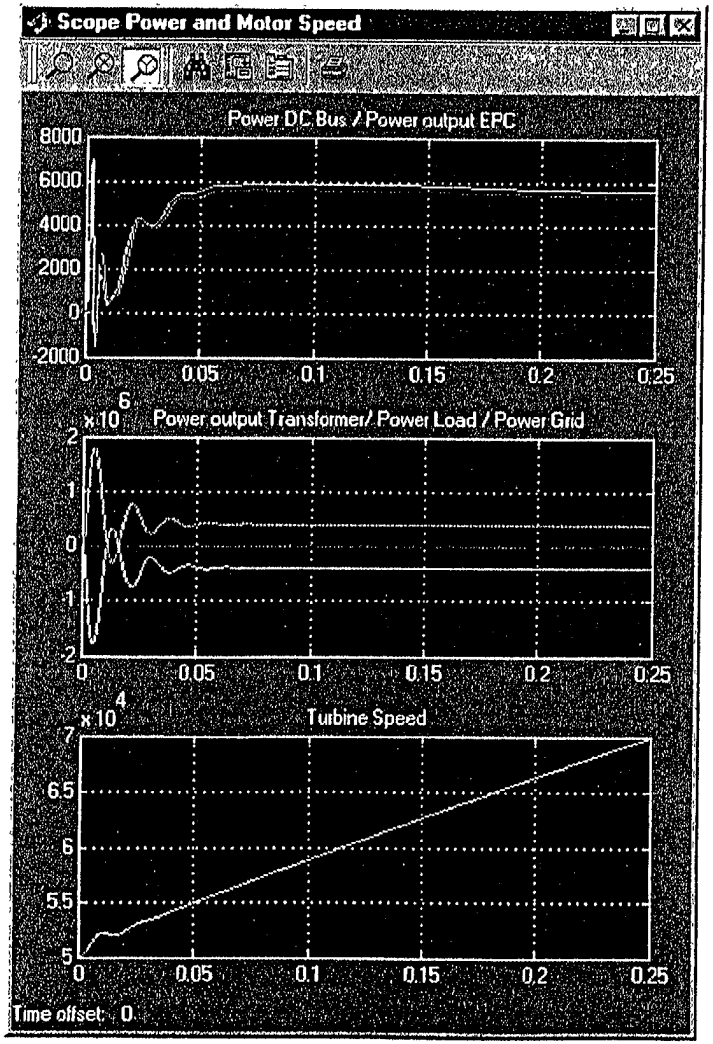
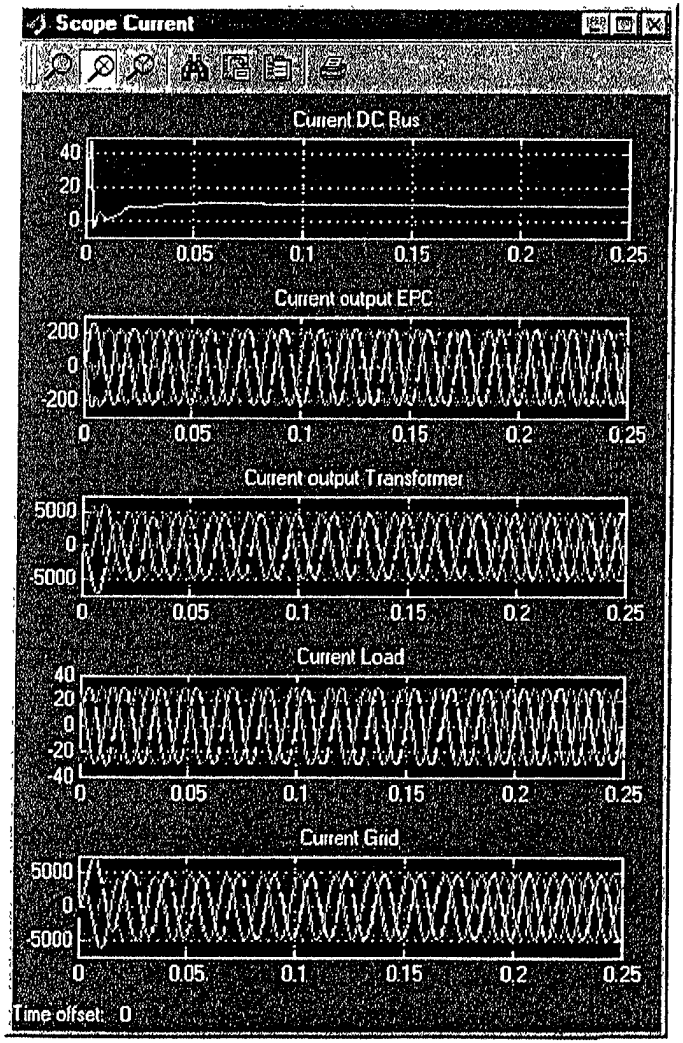

Scope Voltage
Zoom X-axis
Voltage DC Bus
600
400
200
0
0
0.05
0.1
0.15
0.2
0.25
Voltage output EPC
40
20
0
-20
-40
0
0.05
0.1
0.15
0.2
0.25
Voltage output Transformer
500
0
-500
0
0.05
0.1
0.15
0.2
0.25
Voltage Load
500
0
-500
0
0.05
0.1
0.15
0.2
0.25
Voltage Grid
500
0
-500
0
0.05
0.1
0.15
0.2
0.25
Time offset: 0

Figure 18

Figure 19


Scope Power and Motor Speed
Power DC Bus / Power output EPC
8000
6000
4000
2000
0
-2000
0 0.05 0.1 0.15 0.2 0.25
x 10^6
Power output Transformer/ Power Load / Power Grid
2
1
0
-1
-2
0 0.05 0.1 0.15 0.2 0.25
x 10^4
Turbine Speed
7
6.5
6
5.5
5
0 0.05 0.1 0.15 0.2 0.25
Time offset: 0

a.


Scope Current
Current DC Bus
40
20
0
0 0.05 0.1 0.15 0.2 0.25
Current output EPC
200
0
-200
0 0.05 0.1 0.15 0.2 0.25
Current output Transformer
5000
0
-5000
0 0.05 0.1 0.15 0.2 0.25
Current Load
40
20
0
-20
-40
0 0.05 0.1 0.15 0.2 0.25
Current Grid
5000
0
-5000
0 0.05 0.1 0.15 0.2 0.25
Time offset: 0

b.